

WHAT IS CLAIMED IS:

1. A circuit for frequency translating a radio frequency signal, comprising:
a plurality of mixer stages, each mixer stage associated with a particular range of
5 frequencies of a radio frequency signal;

a switching circuit operable to communicate the radio frequency signal to a
selected one of the plurality of mixer stages in response to a control signal;
the selected mixer stage comprising:

a phase generation circuit operable to generate a plurality of phase signals;

10 and

at least one mixer operable to combine the radio frequency signal with one
of the plurality of phase signals to generate at least a portion of an intermediate
frequency signal, wherein the radio frequency signal is weighted according to a
weighting factor.

15 2. The circuit of Claim 1, wherein:

the radio frequency signal comprises a bandwidth approximately ranging from 48
MHz to 852 MHz;

the radio frequency signal comprises a signal of interest approximately ranging
20 from 212 MHz to 424 MHz;

the selected mixer stage comprises:

a first mixer operable to combine the radio frequency signal weighted
according to a first weighting factor with a first phase signal to generate a first
output;

25 a second mixer operable to combine the radio frequency signal weighted
according to a second weighting factor with a second phase signal to generate a
second output;

a third mixer operable to combine the radio frequency signal weighted
according to a third weighting factor with a third phase signal to generate a third
output;

a fourth mixer operable to combine the radio frequency signal weighted according to a fourth weighting factor with a fourth phase signal to generate a fourth output; and

5 a summing circuit operable to combine the first, second, third, and fourth outputs to generate at least a portion of the intermediate frequency signal.

3. The circuit of Claim 2, wherein the phase generation circuit comprises a frequency divider having a division factor of eight coupled to a plurality of delay circuits to generate the first, second, third, and fourth phase signals.

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4. The circuit of Claim 1, wherein:

the radio frequency signal comprises a bandwidth approximately ranging from 48 MHz to 852 MHz;

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the radio frequency signal comprises a signal of interest ranging from 57 MHz to 212 MHz;

the selected mixer stage comprises:

a first mixer operable to combine the radio frequency signal weighted according to a first weighting factor with a first phase signal to generate a first output;

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a second mixer operable to combine the radio frequency signal weighted according to a second weighting factor with a second phase signal to generate a second output;

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a third mixer operable to combine the radio frequency signal weighted according to a third weighting factor with a third phase signal to generate a third output;

a fourth mixer operable to combine the radio frequency signal weighted according to a fourth weighting factor with a fourth phase signal to generate a fourth output;

a fifth mixer operable to combine the radio frequency signal weighted according to a fifth weighting factor with a fifth phase signal to generate a fifth output;

5 a sixth mixer operable to combine the radio frequency signal weighted according to a sixth weighting factor with a sixth phase signal to generate a sixth output;

a seventh mixer operable to combine the radio frequency signal weighted according to a seventh weighting factor with a seventh phase signal to generate a seventh output;

10 an eighth mixer operable to combine the radio frequency signal weighted according to an eighth weighting factor with an eighth phase signal to generate a eighth output; and

15 a summing circuit operable to combine the first, second, third, fourth, fifth, sixth, seventh, and eighth outputs to generate at least a portion of the intermediate frequency signal.

5. The circuit of Claim 4, wherein:

the radio frequency signal comprises a signal of interest within the range of 106 MHz to 213 MHz; and

20 the phase generation circuit comprises a frequency divider having a division factor of sixteen coupled to a plurality of delay circuits to generate the first, second, third, fourth, fifth, sixth, seventh, and eighth phase signals.

6. The circuit of Claim 4, wherein:

25 the radio frequency signal comprises a signal of interest within the range of 57 MHz to 107 MHz; and

the phase generation circuit comprises a frequency divider having a division factor of thirty-two coupled to a plurality of delay circuits to generate the first, second, third, fourth, fifth, sixth, seventh, and eighth phase signals.

7. The circuit of Claim 1, wherein the control signal identifies at least one of a signal of interest or a particular range of frequencies associated with a signal of interest.

8. The circuit of Claim 2, wherein:

5 the summing circuit comprises a first summing circuit; and

the intermediate frequency signal comprises a real part and an imaginary part, the real part formed by the first summing circuit; and

the circuit further comprising:

10 a plurality of additional mixers, each additional mixer corresponding to one of the first, second, third, and fourth mixers; and

a second summing circuit operable to combine outputs of the additional mixers to form the imaginary part of the intermediate frequency signal.

9. The circuit of Claim 4, wherein:

15 the summing circuit comprises a first summing circuit; and

the intermediate frequency signal comprises a real part and an imaginary part, the real part formed by the first summing circuit; and

the circuit further comprising:

20 a plurality of additional mixers, each additional mixer corresponding to one of the first, second, third, fourth, fifth, sixth, seventh, and eighth mixers; and

a second summing circuit operable to combine outputs of the additional mixers to form the imaginary part of the intermediate frequency circuit.

10. A circuit for frequency translating a radio frequency signal, comprising:
a plurality of stages, each stage associated with a particular range of frequencies of
a radio frequency signal;

5 a switching circuit operable to communicate the radio frequency signal to a
selected one of the plurality of stages in response to a control signal;

the selected stage comprising:

means for generating a plurality of phase signals; and

means for combining the radio frequency signal with one of the plurality of
phase signals to generate at least a portion of an intermediate frequency signal,
wherein the radio frequency signal is weighted according to a weighting factor.

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11. The circuit of Claim 10, wherein:

the radio frequency signal comprises a bandwidth approximately ranging from 48
MHz to 852 MHz;

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the radio frequency signal comprises a signal of interest approximately ranging
from 212 MHz to 424 MHz;

the means for combining comprises:

first means for combining the radio frequency signal weighted according to
a first weighting factor with a first phase signal to generate a first output;

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second means for combining the radio frequency signal weighted according
to a second weighting factor with a second phase signal to generate a second
output;

third means for combining the radio frequency signal weighted according
to a third weighting factor with a third phase signal to generate a third output;

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fourth means for combining the radio frequency signal weighted according
to a fourth weighting factor with a fourth phase signal to generate a fourth output;
and

means for summing the first, second, third, and fourth outputs to generate at
least a portion of the intermediate frequency signal.

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12. The circuit of Claim 11, wherein the means for generating comprises a frequency divider having a division factor of eight coupled to a plurality of delay circuits to generate the first, second, third, and fourth phase signals.

5 13. The circuit of Claim 10, wherein:

the radio frequency signal comprises a bandwidth approximately ranging from 48 MHz to 852 MHz;

the radio frequency signal comprises a signal of interest ranging from 57 MHz to 212 MHz;

10 the means for combining comprises:

a first means for combining the radio frequency signal weighted according to a first weighting factor with a first phase signal to generate a first output;

15 a second means for combining the radio frequency signal weighted according to a second weighting factor with a second phase signal to generate a second output;

a third means for combining the radio frequency signal weighted according to a third weighting factor with a third phase signal to generate a third output;

20 a fourth means for combining the radio frequency signal weighted according to a fourth weighting factor with a fourth phase signal to generate a fourth output;

a fifth means for combining the radio frequency signal weighted according to a fifth weighting factor with a fifth phase signal to generate a fifth output;

a sixth means for combining the radio frequency signal weighted according to a sixth weighting factor with a sixth phase signal to generate a sixth output;

25 a seventh means for combining the radio frequency signal weighted according to a seventh weighting factor with a seventh phase signal to generate a seventh output;

30 an eighth means for combining the radio frequency signal weighted according to an eighth weighting factor with an eighth phase signal to generate an eighth output; and

means for summing the first, second, third, fourth, fifth, sixth, seventh, and eighth outputs to generate at least a portion of the intermediate frequency signal.

14. The circuit of Claim 13, wherein:

5 the radio frequency signal comprises a signal of interest within the range of 106 MHz to 213 MHz; and
the means for generating comprises a frequency divider having a division factor of sixteen coupled to a plurality of delay circuits to generate the first, second, third, fourth, fifth, sixth, seventh, and eighth phase signals.

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15. The circuit of Claim 13, wherein:

the radio frequency signal comprises a signal of interest within the range of 57 MHz to 107 MHz; and
the means for generating comprises a frequency divider having a division factor of thirty-two coupled to a plurality of delay circuits to generate the first, second, third, fourth, fifth, sixth, seventh, and eighth phase signals.

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16. The circuit of Claim 10, wherein the control signal identifies at least one of a signal of interest or a particular range of frequencies associated with a signal of interest.

17. A method for frequency translating a radio frequency signal, comprising:
communicating a radio frequency signal to a selected one of a plurality of mixer
stages in response to a control signal;
generating a plurality of phase signals;
5 combining the radio frequency signal with at least one of the plurality of phase
signals at the selected mixer stage to generate at least a portion of an intermediate
frequency signal.

18. The method of Claim 17, further comprising weighting the radio frequency
10 signal according to at least one weighting factor.

19. The method of Claim 17, wherein:
the radio frequency signal comprises a bandwidth approximately ranging from 48
MHz to 852 MHz;
15 the radio frequency signal comprises a signal of interest approximately ranging
from 212 MHz to 424 MHz;
combining further comprises:
combining the radio frequency signal weighted according to a first
weighting factor with a first phase signal to generate a first output;
20 combining the radio frequency signal weighted according to a second
weighting factor with a second phase signal to generate a second output;
combining the radio frequency signal weighted according to a third
weighting factor with a third phase signal to generate a third output;
25 combining the radio frequency signal weighted according to a fourth
weighting factor with a fourth phase signal to generate a fourth output; and
summing the first, second, third, and fourth outputs to generate at least a
portion of the intermediate frequency signal.

20. The method of Claim 17, wherein:

the radio frequency signal comprises a bandwidth approximately ranging from 48 MHz to 852 MHz;

the radio frequency signal comprises a signal of interest ranging from 57 MHz to 5 212 MHz;

combining further comprises:

combining the radio frequency signal weighted according to a first weighting factor with a first phase signal to generate a first output;

combining the radio frequency signal weighted according to a second weighting factor with a second phase signal to generate a second output;

combining the radio frequency signal weighted according to a third weighting factor with a third phase signal to generate a third output;

combining the radio frequency signal weighted according to a fourth weighting factor with a fourth phase signal to generate a fourth output;

combining the radio frequency signal weighted according to a fifth weighting factor with a fifth phase signal to generate a fifth output;

combining the radio frequency signal weighted according to a sixth weighting factor with a sixth phase signal to generate a sixth output;

combining the radio frequency signal weighted according to a seventh weighting factor with a seventh phase signal to generate a seventh output;

combining the radio frequency signal weighted according to an eighth weighting factor with an eighth phase signal to generate a eighth output; and

summing the first, second, third, fourth, fifth, sixth, seventh, and eighth outputs to generate at least a portion of the intermediate frequency signal.

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21. The method of Claim 17, wherein the control signal identifies at least one of a signal of interest or a particular range of frequencies associated with a signal of interest.

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